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THE EFFECTIVENESS OF FINNISH SMALL CAP MUTUAL FUNDS

A Quantitative Study of the Finnish Mutual Funds Investing in the Small Cap Equity Markets of Finland from 2013 to 2016

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International Business
Bachelor's Thesis
Supervisor: Roman Stepanov
Date of approval: 13 April 2017

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ABSTRACT OF
BACHELOR'S THESIS

Author: Veikko Hagman
Title of thesis: The Effectiveness of Finnish Small Cap Mutual Funds

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Degree: Bachelor of Science in Economics and Business Administration
Supervisor: Roman Stepanov

Objectives

The main objective of this thesis is to examine the effectiveness of all the eight currently operational Finnish small cap mutual funds by using descriptive and inferential statistical methods. The secondary objective of the thesis is to determine whether passively managed funds are viable options to active ones.

Summary

This study collected the return indices, for a three-year period ending June of 2016, of the funds and selected stock market indices, and calculated monthly returns using the return data. The findings were analyzed by using charts of cumulative returns, performance related ratios, t-tests and the Fama-French three-factor model.

Conclusions

The results of the study indicate that in the aggregate small cap funds could improve their effectiveness significantly. Additionally, passive alternatives, such as index mutual funds and exchange-traded funds are viable competitors to actively managed funds.

The main reason for the conclusion is that only one of the eight funds that were analyzed could yield better overall results than the benchmark index. OMX Helsinki Small Cap -index was chosen to be the benchmark because it was determined to be the best proxy of the Finnish small cap equity markets. One likely reason for the malperformance of the funds are their high fees which can hinder returns.

Key words: Active investment management, passive investment management, mutual fund, OMX Helsinki Small Cap, Fama-French three-factor model

Language: English

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1. INTRODUCTION

Actively managed Finnish small cap funds invest in the shares of small listed companies domiciled in Finland with the aim of producing excess returns for the investors of the funds by the means of stock picking and market timing. So far, active management has been the main form of investment management but passive, where the fund tracks a benchmark index, has seen its popularity increasing mostly in the United States and to a lesser degree in Europe during the past few years. The focus of this thesis is to analyze the realized value added by fund managers, for example in the form of excess returns on the small cap equity markets of Finland over three years ending June 2016.

1.1. Background and research problem

The first ever index mutual fund called “the Index Investment Trust (now the Vanguard 500 Index Fund)“ was created by John C. Bogle the founder of The Vanguard Group which brought the passive investment management to Main Street (Mihm, 2016). However, some custom-made solutions existed before the index fund for institutional investors. Initially, the index fund was not well received by the fund management industry because they denounced it as “un-American” due to the mission of merely tracking the average return of the market in the form of an index. The bad publicity of the passive management resulted in a slow initial growth of clientele in the United States and it is still a rarity in most of the world (Steverman, 2016).

At the moment, active management is the dominant form of investment management worldwide but there are significant regional differences. For example, passive management constitutes approximately 30% of the industry in the United States in terms of assets under management but only 15% in Europe. However, there are some

predicting that Europe will follow suit (Mnyanda, 2017). The main factor behind this development is the growing dissatisfaction with the returns of the active management which are not at the level to justify the fees. As a consequence, investors are now focusing on the costs of investing because those can be detrimental to the long-term returns in case the fund does not yield returns to compensate the fees since the performance difference compounds over time (Adams, Mansi, and Nishikawa, 2012). However, it might not be ideal for the workings of the market that passive management becomes dominant, since the active provides a social good by keeping the markets liquid and fairly priced.

Much of the research has focused on bigger markets, such as the United States but smaller ones, like Finland, have been subject to less scrutiny. Previous findings indicate that further research is required about the effectiveness of active management in Finland and more passive alternatives should be available to investors since few companies offer them. The main justification for the latter is that there is a real market for passive products in Sweden ranging all the way from broad market trackers to niche small cap funds (Davis, Tokat, Sheay and Wicas, 2008; Malkiel, 2015; Af Heurlin, 2017a; Af Heurlin, 2017b XACT, 2017).

In response to the gap in the research and to justify the raison d'etre for a new type of index fund in the Finnish mutual fund market, the focus of this thesis is to compare the performance of actively managed small market capitalization mutual funds with the benchmark index of the Finnish small cap equity market, called the OMX Helsinki Small Cap. To further evaluate the performance and to identify possible biases, the returns of the funds are also contrasted with the benchmark index most of the funds assigned for themselves, known as the Carnegie Small CSX Net Return Finland. Additionally, the returns are compared with the OMX Helsinki Cap index which tracks the Helsinki Stock Exchange in order to evaluate the overall performance of the small cap sector (Carnegie Investment Bank, 2017; Nasdaq, 2017).

1.2. Research questions

This thesis addresses the following questions:

1. How has active management performed against passive management overall but also in risk-adjusted terms in the small cap equity markets of Finland?
2. Have the actions of fund managers added value for their clients in the form of alpha?
3. What kind of a relationship is there between the total expense ratio and the returns of the funds?
4. Has the small cap sector performed sufficiently well compared to the overall Finnish stock market to compensate for the inherent riskiness of smaller companies?
5. Have the active funds chosen the correct benchmark index for themselves?

1.3. Research objectives

In the process of answering the questions, the thesis tries to fulfill the following objectives. Firstly, it tries to compare the relative returns of active investment management with passive by using an index as proxy. Secondly, it attempts to evaluate the talent of fund managers by focusing on the risk-return ratio. Thirdly, to analyze whether fund managers have been able to add value in relation to the systematic risk of the market measured by alpha. Finally, the thesis tries to gain evidence whether passive funds would be viable alternatives for the active ones currently dominating the Finnish small cap equity markets.

1.4. Definitions

Active management is best characterized by having people managing the assets of the fund. They conduct research and invest on the basis of the findings. Furthermore, it is common that these managers do not think that the markets are efficient which may result in mispriced assets that can be bought to outperform the market by incurring arbitrage profit (Bodie, Kane and Marcus, 2014). The two main types of active management are growth and value. In growth, investors are interested in companies that are characterized by having high valuations in terms of price to earnings multiples and promising prospects. In value, the aim is to buy companies that are priced below their intrinsic value on the stock market in the hopes that there is a positive correction resulting in windfall profits (Pettersson and Hård, 2012).

In passive management, the strategy is to track a benchmark index as accurately as possible because its adherents believe that the markets are efficient which means that it cannot be beaten since mispricing does not exist (Bodie, Kane and Marcus, 2014). The main investment vehicles of this style are index mutual funds and exchange-traded funds (ETFs). As previously mentioned passive funds try to track their benchmark index but they can do it in two different ways which are physical and synthetic replication. In the former, the fund buys all or some of the stocks of the index to replicate its performance as accurately as possible. In the latter, the index is replicated by using derivatives, such as SWAP contracts which allow for a more accurate and cheaper tracking of the benchmark. However, these advantages come with disadvantages because derivatives are subject to counterparty risk (Pettersson and Hård, 2012).

The index provider Nasdaq defines small cap companies as such whose market value is less than 150 million euro (2012). However, the definition varies by the context, for example, Statistics Finland defines them as companies whose balance sheet total is less than 43 million euro (2017). Unfortunately, the varying definitions can lead to differences in the focus of the funds but also in the returns. However, for this thesis, the definition of Nasdaq is used when referring to small cap companies because the main benchmark index of the thesis is provided by them.

2. LITERATURE REVIEW

It is necessary to have a review of the past studies to successfully conduct quantitative analysis into the effectiveness of active management in Finnish small cap equity markets. The main areas of interest are efficient market hypothesis (EMH), small market capitalization stocks and the historical performance of funds. Moreover, the aim of this literature review is to consult previous studies so that the analysis can try to better address the knowledge gap about the equities. The past literature should aid in formulating the research by granting ideas of the value added by fund managers, and the relative performance of funds in regard to a passively managed alternative if one were to exist.

Firstly, the most fundamental area of inquiry is the EMH for its validity should be the main determinant of the choice of investment management style. If the hypothesis is true, then it is difficult for fund managers to compete with passive funds. In other words, the likelihood of yielding excess returns is limited when securities are accurately priced for it narrows arbitrage potential. Furthermore, studies into the weak form efficiency, the effectiveness of trading rules, and market anomalies are examined to gain indicative evidence on the source of possible alpha. However, due to the discovered lack of exploration into funds investing in small Finnish companies, the literature review is focused on other equities. Due to globalization and interconnectedness of markets, international marketplaces can be indicative of the state of the Finnish small caps. However, there is a chance that international assets might fail to adequately represent the Finnish equity markets, thus haste conclusions must be avoided. Nevertheless, if there appears to be a large degree of informational efficiency, then passive management should be favored over active in Finland and elsewhere but in other cases, greater investor judgment and consideration is necessary.

Secondly, the rationale for choosing small cap stocks is presented to make sure that the market is not overlooked. Some investors might ignore these stocks because their total share of the overall stock market is low. Furthermore, investing in any asset class

desirably increases profitability, decreases risk or increases the efficiency of the portfolio.

Thirdly, studies into the actual effectiveness of fund management industry are examined to gain indicative evidence whether any positive performance discovered by the investigation of the author can be believed to be persistent. The consistency of returns is desirable because unnecessary transactions should be avoided when investing to prevent taxes and other implications, which can hinder long-term returns. Moreover, it is crucial to know the ongoing performance of funds in diverse markets and time periods because the statistical research presented in the latter section considers only specific samples and might not be representative of others.

Lastly, studies concerning behavioral finance are not covered in this literature review since the field is explanatory rather than predictive in nature. Even though it grants insights into the behavior of investors, it does not predict performance of securities and therefore cannot be used to yield excess returns, which are the focus of the latter sections. More specifically, behavioral finance fails to contribute to the debate on EMH since to refute it the ability to generate excess returns using a set of information is necessary due to the scope of the research of this thesis. For the same reason, studies focusing on the informational efficiency of asset markets in terms of deviations from intrinsic value are not taken into consideration. The technical aspects of asset pricing models of the literature are not examined thoroughly for the model to adjust returns for risk is presented in detail in the methodology section. Having defined and introduced the scope of the literature review, the EMH is presented in the following chapter both in general and in detail.

2.1 Efficient market hypothesis

As previously mentioned, the standpoint on the topic of investment management and which form to follow should be based on the validity of EMH, which applies universally

to all equity markets. Hence, evidence from elsewhere should be indicative of the Finnish markets.

If the EMH is true, then information is already incorporated into security prices and excess returns cannot be made using that information due to assets being fairly valued. Excess returns are attributable to skill especially in regard to forecasting rather than exposure to risk. However, there are three strengths of market efficiency: Weak, semi-strong and strong form. These forms are nested which means that latter forms include the former ones. Weak form asserts that past information (for example, historical prices and volumes) is incorporated in the market prices meaning that technical analysis cannot yield excess returns. Moreover, the semi-strong form suggests that all public information (for instance, financial statements and annual reports) is reflected in the prices. Resulting in fundamental analysis not producing excess returns. Lastly, strong form market efficiency would mean that even private information is reflected through the prices, consequently, insider trading, which is prohibited in most countries, would not produce excess returns (Jordan, Miller, and Dolvin, 2012).

However, not all of the three forms of EMH have to be true in order to invest passively instead of actively. It is sufficient that the semi-strong is true because trading using insider information is illegal and consequently cannot be a sustainable investment strategy. If none of the forms is true, then investors should engage both in technical and fundamental analysis. If only the weak form is true, then it is only advisable to conduct the latter analysis (ibid). After a general overview of the EMH, an evaluation of the likelihood of informational efficiency begins the more specific analysis.

2.1.1 Impossibility of informational efficiency

In order to understand the debate on investment management, it is important to accept the fact that markets cannot be fully informationally efficient. Grossman and Stiglitz (1980) were one of the most famous to conclude that it is impossible for the markets to be constantly informationally efficient. They did this by proposing and testing a model

where “there is an equilibrium degree of disequilibrium: prices reflect the information of informed individuals (arbitrageurs) but only partially, so that those who extend resources to obtain information do receive compensation” (ibid:393). Additionally, they proposed several conjectures of which some might predict the state of the asset markets in the future. For instance, prices will become more efficient when the number of informed traders increases but at the same time, the benefit from being informed decreases (ibid). However, as Malkiel (2003) and others state that the incomplete efficiency rarely leads to consistent alpha over time in the aggregate. To conclude, there is a possibility to generate excess returns due to incomplete efficiency, but to evaluate the extent of it, it is useful to examine past studies of weak form market efficiency and the utility of trading rules to see how the model works in reality.

2.1.2 Weak form market efficiency

Moving on to studies on weak form efficiency (past information is incorporated in prices), there seem to be slight trends in share prices in different samples varying by location and time which means that the idea of the movement of share prices resembling a random walk is not always true. As several academics have demonstrated, investors would have been able to yield positive gross returns, using technical trading strategies based on different rules in Indian, British and selected Asian markets (Hudson, Dempsey, and Keasey, 1996; Poshakwale, 1996; Kim, Shamsuddin, 2008). However, only the British study by Hudson et al. accounted the results for trading costs, which changed them considerably: “Thus, the above results contradict the efficient market hypothesis only in the absence of actual trading costs” (1996:1130). What is more, the long-term sustainability of the rules is highly unlikely as concluded by Timmermann and Granger “[were we able to forecast consistently] there would exist a ‘money-machine’ producing unlimited wealth, which cannot exist in a stable economy” (2004:15). These discoveries of the previously mentioned studies agree with and are supported by several others conducted in the United States since costs tend to render technical trading rules useless (Malkiel, 2015). However, the evidence from all over the world does not mean that we should not study the

effectiveness of technical trading rules. It is possible that innovations will decrease the amount of costs to such a degree that the rules become profitable or possibly the markets become so efficient that the rules no longer yield even positive gross returns. Nevertheless, it is unknown whether the Finnish managers of small cap equity funds can use technical trading rules to benefit investors but perhaps market anomalies offer greater profit-making opportunities.

2.1.3 Anomalous evidence of market inefficiency

Another basis for disagreeing with EMH arises from anomalies, which should not exist, were the investors rational due to the markets being informationally efficient. Both Jensen (1978) and Schwert (2003) conducted independent research into the contemporary literature and identified anomalies, such as risk-adjusted excess returns post earnings announcement and statistically significant abnormal returns when trading on the discounts and premiums of closed-end fund shares. However, Jensen asserts that the results are more complex than they initially appear: “In most cases our tests of market efficiency are, of course tests of a joint hypothesis; market efficiency and, in the more recent tests, the two parameter equilibrium model of asset price determination” (1978:2). In fact, in his paper, Ross studied “the Closed End Fund Puzzle” (2002:129) and proposed an explanation ending the anomalous nature of the phenomena. He demonstrates that the average discount rate of a closed-end mutual fund share is equal to the discount of managerial fees as a percentage of net asset value (NAV) from the average annual capital gains and dividend yields of NAV (ibid). To conclude, any anomaly should be examined thoroughly before it can be asserted that it violates the informational efficiency, however, some inefficiencies might yield excess returns even though it seems unlikely.

2.1.4 Profitability of market inefficiencies

It is natural to end the overview of the literature on EMH by concentrating on studies focusing on the criticism of EMH authored by Burton Malkiel and Eugene Fama. Their findings are fortunate for the supporters of the hypothesis but unwanted to the opponents.

The academics conclude in unison that managers largely cannot use market inefficiencies to realize above-average returns without the accompanying risk (Fama, 1998; Malkiel, 2003). As Fama shows the foundations of several anomalies are fleeting and their significance to investors is questionable: “The recent finance literature seems to produce many long-term return anomalies. Subject to scrutiny, however, the evidence does not suggest that market efficiency should be abandoned” (1998:304). Furthermore, Malkiel concludes his findings by asserting that it is highly unlikely that arbitrages would offer consistent long-term opportunities: “Moreover, whatever patterns or irrationalities in the pricing of individual stocks that have been discovered in a search of historical experience are unlikely to persist and will not provide investors with a method to obtain extraordinary returns. If any $100 bills are lying around the stock exchanges of the world, they will not be there for long” (2003:80). However, there are authors arguing that investors should continue to use active management for successful managers can be identified by using different indicators, like the active share (Cremers and Petajisto, 2009; Jones and Wermers, 2011; Petajisto, 2013). In summation, market inefficiencies rarely offer profit-making opportunities but investors can try to increase their profits by investing in riskier asset classes, such as small caps.

2.2 Small market capitalization stocks

After an analysis of the EMH, the usefulness of technical trading rules, and market anomalies, several aspects related to investing in small market capitalization stocks are evaluated in the following order. Firstly, the reasons for allocating assets in general to small cap stocks are identified. Secondly, further arguments for investing in euro area (including Finland) small cap stocks are presented. Thirdly, a common belief about small cap fund managers is evaluated.

The main reason for investing in small cap stocks is their superior returns compared with other asset classes. Over the period from 1926 to 2013 the arithmetic mean of the annual returns of the US small company stocks was nearly 17% which is 5 percentage points (pp) more than the ones of large-company shares, however small caps were considerably riskier for their standard deviation was 30% which is 50% greater than the standard deviation of large caps (Malkiel, 2015). Additionally, Malkiel argues that investing in multiple equity classes decreases the systematic risk and makes the portfolio more optimal by decreasing volatility without risking returns (ibid). Nevertheless, there are further costs to these returns because investors are exposed to an additional risk factor meaning that excess returns are unlikely to be realized in the aggregate but the returns for the risk seem to be persistent over time in several markets (Fama et al., 1993; Bauman, Conover and Miller, 1998). However, if investing in small caps becomes too popular, then investors will bid up prices eliminating the potential rewards for bearing the risks. To conclude, it appears that small cap stocks should be a part of a diversified portfolio especially when the investment horizon is extended to account for the elevated volatility.

Having argued for the need to invest in small cap stocks in general, further reasons for considering euro area alternatives, even though they are a small portion of the global equity markets, are presented herein. The main reason for the inclusion of euro area small cap stocks is that “Empirical analysis shows that euro area small and mid-cap stocks, as classified by size quartile and quintile rankings, arise as truly autonomous asset classes” (Petrella, 2005:229). Surprisingly, the inclusion of euro area small caps cannot be substituted by owning US equivalents (ibid). In practice, this means that owning of the euro asset class should decrease the portfolio variance making the portfolio more optimal which is a desirable outcome in the opinion of any rational investor.

There is a common belief among investors that active managers are more likely to add value when controlling active small cap stock funds due to the rationale that the information related to small caps is costlier, therefore harder to acquire meaning that

the information is imperfectly reflected in the prices unlike in large caps (Grossman et al., 1980). Furthermore, there has been some evidence of small cap funds yielding positive risk-adjusted returns for considerable time periods, for instance, a small cap fund from Dimensional Fund Advisors produced an average annual premium of over 2% from 1982 to 1995 (Keim, 1998). However, there is conflicting research showing that the belief of average small cap fund yielding excess returns is merely a myth. Davis, Tokat, Sheay and Wicas (2008) concluded that the significant positive performance of numerous funds is due to a rebalancing issue in Russell indices which are common benchmarks, because the positive results disappear when the funds are compared with others, such as Wilshire and MSCI Small Cap Indices. Additionally, others have concluded that in some cases overlooking the following issues can deceit one to believe that there is significant alpha when none exists: fees, biases in the data and using a traditional benchmark index instead of using an effective style mix benchmark, which would avoid the arbitrary categorization of funds (Ennis and Sebastian, 2002). To conclude, the belief of the superior performance of small cap managers does not seem to be true but active management might still be a viable option if the passive investment products themselves do not perform as well in practice as in theory.

2.3 Historical performance of investment management styles

2.3.1 Passive management

Having scrutinized active management, it is in place to do the same for the passive. On the one hand, it should be noted that by design passive investment products, such as most exchange-traded funds and index mutual funds will not beat their benchmark indices (Jones et al., 2011). On the other hand, it has been shown that in several developed markets, for example in the United States, active funds are performing poorly compared with a simple S&P 500 index fund. “Over the 10-year period ending 31 December 2001, 71% of actively managed equity funds have produced total returns (including dividends and capital changes) that were inferior to the returns achieved by

the index fund, after expenses" (Malkiel, 2003:3-4). However, results from some authors indicate that passive management in the form of ETFs is not superior to the active at least over certain time periods in emerging markets (Kremnitzer, 2012; Purohit and Malhotra, 2015). More precisely, a study focusing on the US mutual funds and ETFs investing in emerging markets concludes that "before tax, actively managed mutual funds yielded superior 3 year net-of-fees returns of approximately 2.87% over passively managed ETFs" (Kremnitzer, 2012:1). However, the author did not conduct "a full time series Fama French 3 Factor analysis" (ibid:32) which would likely better account for the riskiness of the investment activities. In other words, it is possible that the performance of the active funds is the result of greater risk and not skill. What is more, there are both premiums and discounts in the prices of Indian ETFs to their NAV lasting up to five days which is highly undesirable (Purohit et al., 2015). To conclude, passive management is a viable option in developed large cap markets but there seems to be uncertainty when it comes to others.

2.3.2 Active management

To end the chapter about the historical performance of investment management styles, the historical merits of active management are evaluated. Sharpe (1966) conducted one of the earliest and most significant studies into the performance of mutual funds and his findings further increased the doubt about the usefulness of active management. He concluded that there are some variances in fund performance, which are not entirely temporary and mostly due to differences in expense ratios (ibid). However, his data was limited to 34 funds over the period 1954-1963. Fortunately, others, such as Jensen (1968), Carhart (1997) and Fama and French (2010) have studied the topic and their findings are even more discouraging to the fund management industry. Another well-known study concludes that on average mutual funds were not superior to a buy and hold portfolio, additionally, "there is very little evidence that any individual fund was able to do significantly better than that which we expected from mere random chance" (Jensen, 1968:415). However, later academics have proven that the capital asset pricing model used by Jensen imperfectly correlates

with risk and return, therefore it has been updated by adding more risk factors to make it more trustworthy (Fama et al., 1993; Carhart, 1997). Fama and French reveal that only “few funds produce benchmark-adjusted expected returns sufficient to their costs” (2010:1915) and in most cases the ones who produce positive net returns are lucky (ibid). This further supports the previous findings of Carhart (1997) that positive short-term persistence of returns is due to the fact that fund managers happen to by luck hold securities that perform well in the short-term, however, they seem to lack skill because they fail to do the same consistently. On the contrary, there is considerable persistence in the bad performance of the worst mutual funds (ibid). Nevertheless, these findings are in some degree of conflict to the secondary research of Jones and Wermers (2011) who claimed that there is enough consistency in fund manager returns to justify dedicating resources to finding them. If the performance of Finnish small cap managers correlates with others, it can be assumed that their performance might also lack persistence.

2.4 Conclusion

To begin with, investing in Finnish small caps should make a portfolio more efficient if they behave like their euro area equivalents. Moreover, based on the previous research it can be inferred that widespread persistent excess returns should be unlikely but at least some of them should do well in the short-term and few also over time because markets cannot be fully informationally efficient. Nonetheless, these results are more likely due to luck than successful utilization of fundamental analysis or private information but even far more implausible attributable to trading based on technical analysis and anomalies because costs tend to render such strategies useless. Despite the imperfections of active management, passive alternatives are not necessarily superior even though the active might not be able to beat their benchmark index due to the markets being largely efficient, hence it cannot be concluded definitely, which style of investment management to follow based on the research in the following section.

2.5 Hypotheses

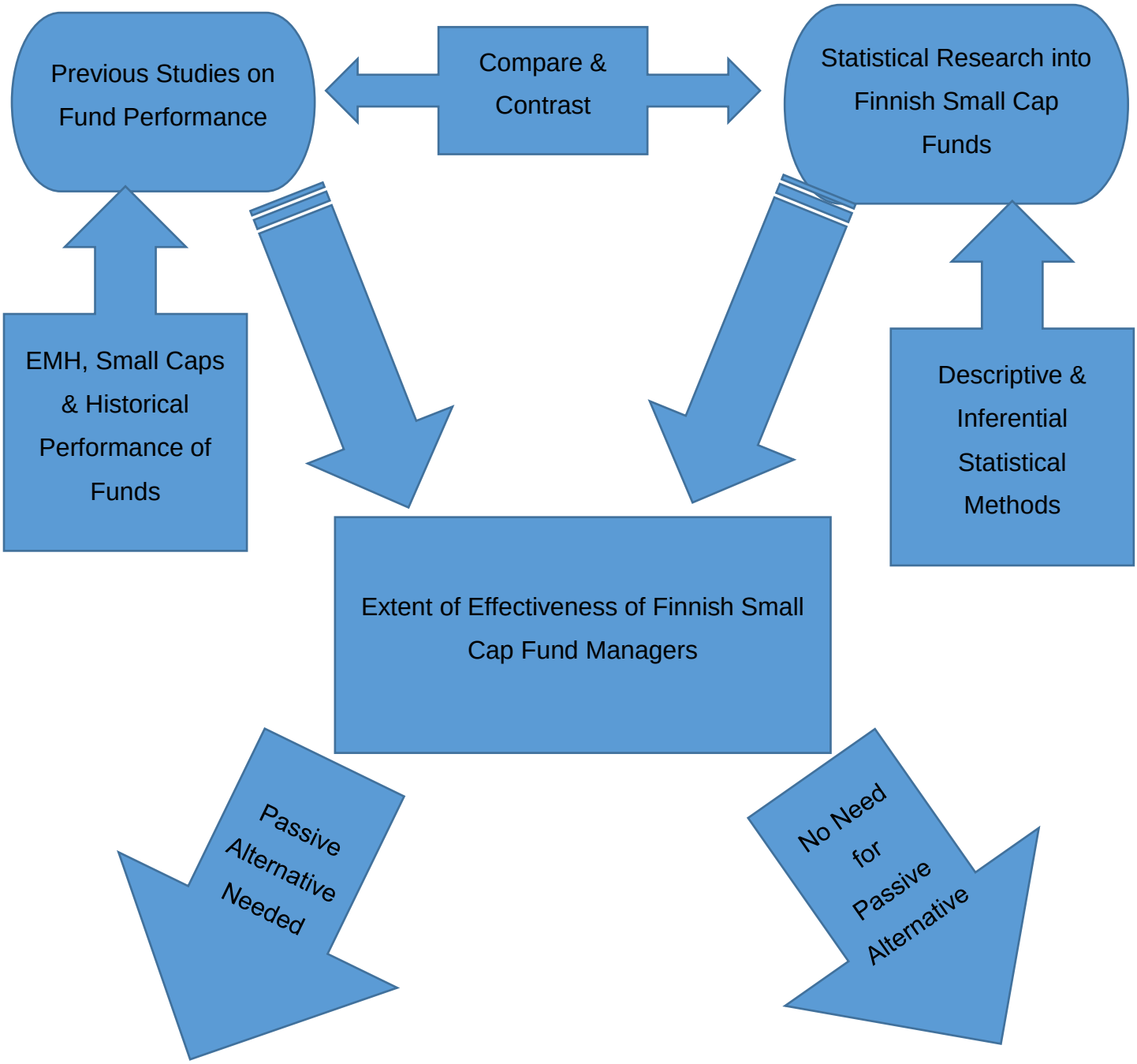
This thesis has two different null hypotheses one for each of the main methodologies because they measure different things, hence preventing the use of a single null hypothesis. The first one is for the t-tests and the latter one for the Fama-French three-factor model.

The null hypothesis of the paired two-sample t-tests is that there is no statistically significant difference between the monthly returns of the passive and active management because the benchmark index represents the average performance of the market. As a consequence, the null hypothesis is as follows:$H_0: \mu_1 = \mu_2$. However, it is possible that there are statistically significant differences between the groups which leads to the alternative hypothesis being the following: $H_1: \mu_1 \neq \mu_2$.

Irrespective of the results of the paired two-sample t-tests, the performance of the funds and the indices should largely be the result of exposure to the market return net of risk-free rate (K_m-R_f) and small cap (SMB) risk factors of the Fama-French three-factor model because both the funds and the indices invest in publicly traded securities. Hence, the second null hypothesis is that excess returns (alpha) which represent the returns attributable to skill should not exist because the literature review indicates the markets to be largely efficient.

$$r = R_f + \beta_3\left(K_m - R_f\right) + b_s * SMB + b_v * HML + \alpha$$

2.6 Conceptual framework



3. METHODOLOGY

The central research methodology of this Bachelor's thesis is the primary quantitative analysis of secondary data. This research was inspired by previous academics, such as Burton Malkiel and Michael Jensen who mostly researched global markets and small market capitalization equity markets of the United States. Therefore, this paper utilizes similar research methodologies but for a different time period and for the Finnish small cap fund industry.

The analysis begins with descriptive statistics which provides a general overview of the data and then continues to inferential which in turn is more specific and addresses the two hypotheses. First, chart-based comparisons visually describe the returns of the funds and the indices. Next, the review of different performance ratios summarizes the data numerically and delivers a broader understanding of it. Followingly, paired two sample t-test for means compromises the first half of the inferential statistics. The t-test is used to identify significant differences in the returns of the funds and the indices. In the latter half of the inferential statistics, multiple linear ordinary least squared (OLS) regressions of the risk factors of the Fama-French three-factor model and the net of risk-free rate returns of the funds and the indices are conducted to identify alpha to verify the source of the returns.

The data of this thesis is the return indices of the Finnish small cap mutual funds and the indices. Return series for the funds and the two Nasdaq indices were retrieved from the Thomson Reuters DataStream and the data for the Carnegie index was taken from their own website. The factor data was obtained from the website of Kenneth French (2017) and the total expense ratios from the websites of the funds. The analysis focuses on the time period from the 28th of June 2013 to the 30th of June 2016. All the data was retrieved in daily format and converted into monthly so that the data would best suit the needs of this thesis. The main purpose for this was to maximize the number of available data points for the fund from Taaleri and to increase the comparability of the results because the Taaleri fund was founded on the 2nd of

December 2013. However, if it were not included there would only be seven funds to analyze. Furthermore, beta and R squared calculations were contradictory for daily data but the same did not affect monthly data which gave additional support for its use over the daily (see appendix 2)[1].

The full names of the funds and the indices are as follows: Danske Invest Pienyhtiöt K (DI), OP Pienyhtiöt A (OP), Säästöpankki Pienyhtiö B (Säästöpankki), Evli Finnish Small Cap B (Evli), Fondita Equity Spice B (Fondita), Nordea Suomi Small Cap K (Nordea), SEB Finland Small Cap B (SEB), Taaleri Mikro Markka A (Taaleri), OMX Helsinki Cap (OMXH Cap), OMX Helsinki Small Cap (OMXH Small Cap), Carnegie Small CSX Net Return Finland (Carnegie). All of the funds (growth instead of income) and indices (return instead of price) reinvest their dividends back into themselves which makes the two groups comparable. Growth funds were chosen over income because the former are recommended to long-term investing because paying taxes is postponed, hence they do not hinder the compounding impact of interest. Additional information about the funds including International Securities Identification Numbers is presented in the appendix 1.

3.1. Chart-based comparison of cumulative returns

At the first level of the analysis, a chart-based method of investigating the cumulative performance is taken in order to examine the performance of the funds and the indices over the desired time period. What is more, visual illustrations offer additional insight into the study because there can be significant differences between annualized average returns and the cumulative returns. The returns can differ significantly since the former does not account for losing some of the principal value of the investment which is extremely harmful.

[1] Daily data is affected by a significant conflict between the beta and R squared. Most funds have the highest beta with the small cap index but he highest R squared with it. However, this irregularity does not exist in the monthly data since both the beta and R squared are the highest between the funds and the total market index.

In further detail, the cumulative returns are graphed using monthly data and are represented by the hypothetical development of an invest of one unit of currency to the respective funds and indices. Moreover, an additional graph is provided to analyze the relationship between the fees and the returns.

3.2. Ratio analysis

At the second level of the analysis, performance and tracking related indicators are examined and presented in numeric form. The main categories of ratios are explanatory, risk-return, absolute return and risk ratios. Some of these ratios are presented and calculated for time periods of differing length.

More precisely, the ratios of interest are beta, R squared, Sharpe ratio, and both monthly and annualized returns and standard deviations, which are explained in the order of appearance. The purpose of beta and R squared is to examine how closely the monthly development of the funds is explained and corresponds with the benchmark index but also with the two other indices. Beta (β) measures the movements of a particular asset which is determined by the stock market. In other words, beta is the ratio between of the covariance of the asset and market returns divided by the variance of the market returns (Brealey, Myers and Allen, 2011).

$$\beta = \frac{\sigma_{im}}{\sigma_m^2}$$

Where:

β is the beta coefficient

σ_{im} is covariance between the stock returns and the market returns

σ_m^2 is the variance of the returns on the market

The measures are of interest to investors because it is desired for any fund to follow its stated strategy as accurately as possible. However, there can be unavoidable correlations with the broad market index which may be the result of several issues. To mention a few, the size of the Finnish stock exchange is small, many of the funds can

invest in European small cap stocks in addition to the Finnish ones, and the operational definition of small market capitalization companies of the funds might differ from the definition of Nasdaq resulting in investing in considerably different assets.

The Sharpe ratio is used to evaluate the risk-return relationship of the performance of the funds. The higher the Sharpe ratio of a portfolio the more efficient it is. In practice, it is derived by dividing the risk premium with the standard deviation. The risk-free rate used in the calculations is the average three-month Euribor as suggested by Kallunki, Martikainen, and Niemelä (2007).

$$\text{Sharpe ratio} = \frac{r - r_f}{\sigma}$$

Where:

r is the return of the portfolio

r_f is the risk-free rate

σ is the standard deviation of the returns

The rationale for having average returns and standard deviations is that those can be extrapolated to provide perspective about the long-term development of the investment. The returns are calculated logarithmically instead of arithmetically.

$$r = \log\left(\frac{p_i}{p_j}\right)$$

Where:

r is the logarithmic return of an asset

p_i is the value of an asset at time i

p_j is the value of an asset at time j

The standard deviation is computed by following the formula below to measure the dispersion of the returns (Besley and Brigham, 2015).

$$\sigma = \sqrt{\sum_{i=1}^{n} (r_i - \hat{r})^2 P r_i}$$

Where:

σ is standard deviation

∑ is the summation of sample variance

3.3. Paired two sample t-test for means

At the third level of the analysis paired two sample t-tests for means are conducted in order to examine the extent of differences in the returns of funds and the indices. However, it is possible that the differences in monthly movements are statistically insignificant but they can still have a considerable impact on the cumulative returns over time.

The following assumptions about the data must be made before conducting the two sample t-tests for means. The samples must be independent, normally distributed and have equal variance (Levine, Krehbiel, and Berenson, 2013). T statistic is calculated by utilizing the data analysis tools of Microsoft Excel using the following formula. If the computed T_{stat} is larger than the t critical, then the hypothesis about the means must be rejected.

$$t_{stat}=\frac{\widehat{\beta}-\beta_0}{s.e.(\widehat{\beta})}$$

Where:

β is the unknown parameter value

β_0 is a known non-random constant

$s.e.(\widehat{\beta})$ is the standard error of the estimator $(\widehat{\beta})$for β

3.4. Fama-French three-factor model

At the fourth and final level of analysis, multiple linear regressions of the Fama-French three-factor model developed by Eugene Fama and Kenneth French are conducted by using Microsoft Excel for all the funds and the indices. This is perhaps the most integral

part of the analysis since the model is one of the indicators that can successfully identify the performance of fund managers regarding skill.

The model is superior to the older capital asset pricing model because studies have shown that there is no significant long-term correlation between beta and returns. As previously mentioned in the earlier section of this thesis, the authors expanded and improved it by adding the small cap (SMB) and value factors (HML) to the market returns (Fama and French, 1993). The goal of fund managers is to produce alpha which is also known as excess returns meaning that the returns are not explained by the risk factors but skill. The exposure to the risk factors is of interest to investors because in larger and better served markets the exposure can be easily mimicked by utilizing factor based investing through ETFs.

There are other models with additional factors, such as the Carhart four-factor model which adds a momentum factor to the equation below. Unfortunately, that model is less established than the Fama-French model. Therefore, in order to adhere to the commonly accepted methods and to keep the model simpler the latter model is used.

$$r = R_f + \beta_3\left(K_m - R_f\right) + b_s * SMB + b_v * HML + \alpha$$

Where:

r represents the return of the asset

R_f represents the risk-free rate

K_m represents the return of the market

β_3 represents the beta of the portfolio to the market

b_s and b_v represent coefficients of the SMB and HML risk factors

α represents the excess returns

The dependent variable is the monthly returns net of risk-free rate and the independent variables are the risk factors of the model. The estimators (risk factors) were derived by using a method where model portfolios were formed based on certain criteria and then computing the difference of the monthly returns of the two portfolios. For example, the firm size factor (SMB) was retrieved by deducting the returns of the large company

portfolio from the returns of the small company portfolio. The value factor was derived similarly by subtracting the returns of companies with low book to market valuations from the returns of companies with high valuations. The overall market factor was calculated by deducting the risk-free rate from the monthly returns. Most of the returns should be explained by the market return (K_m-R_f) and small cap risk factors but in the cases where the fund has a small cap value strategy, the value factor (HML) might have additional explanatory power. However, if this is not the case then there might be issues either with the data set, model or with the investing strategy of the funds.

Ideally, basic assumptions should be tested to be sure about the relationship between the risk factors and the returns to verify the unbiasedness and the effectiveness of the OLS regression. Firstly, it is assumed that the errors are normally distributed. Secondly, it is believed that the errors are independent (no autocorrelation). The third supposition is that there is a linear relationship between the dependent variable (returns) and the independent variable (risk factors). Fourthly, it is presumed that homoscedasticity exists. Fifthly, it is assumed that there is no multicollinearity. It would be optimal to conduct tests to verify all of the assumptions in order to maximize the extent of which the findings and the data can be generalized. Unfortunately, performing the different tests was determined to be out of the scope of a Bachelor's thesis. Nevertheless, tests are conducted to verify the normality of the errors because it is thought to be the most significant of all the assumptions.

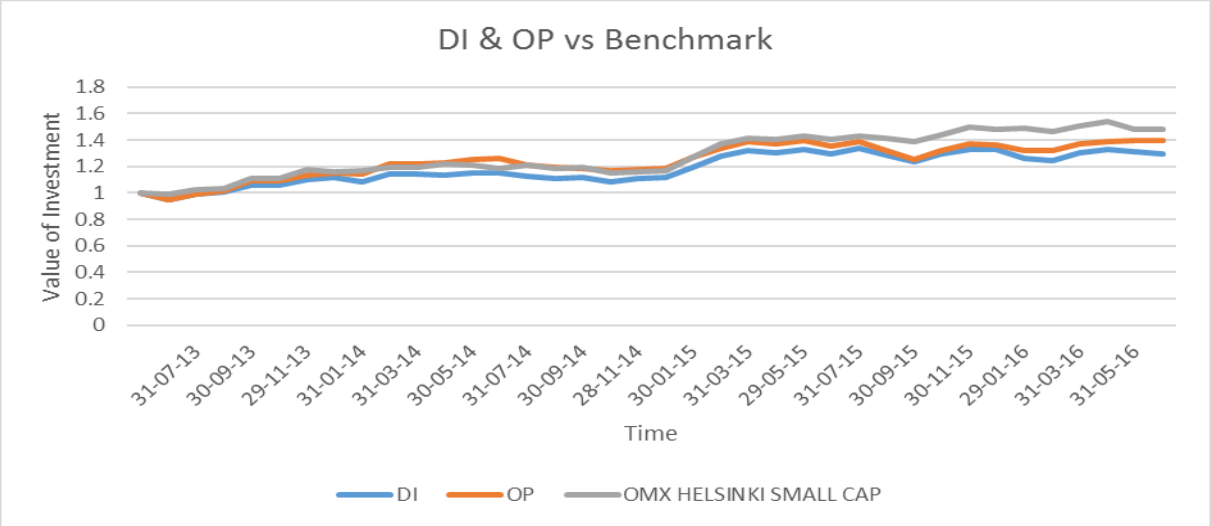
4. FINDINGS

4.1. Chart-based comparison of cumulative returns

At this first level of the analysis, the cumulative returns of the funds and the indices are compared with the benchmark index of the small cap equity markets of Finland known as the OMX Helsinki Small Cap. The subjects are compared in pairs with the benchmark to ease comprehension and to avoid cluttering. Additionally, cumulative returns, compound annual growth rates (CAGR) and total expense ratios (TER) are presented in numeric form and the relationship between the two latter is evaluated in graphical form.

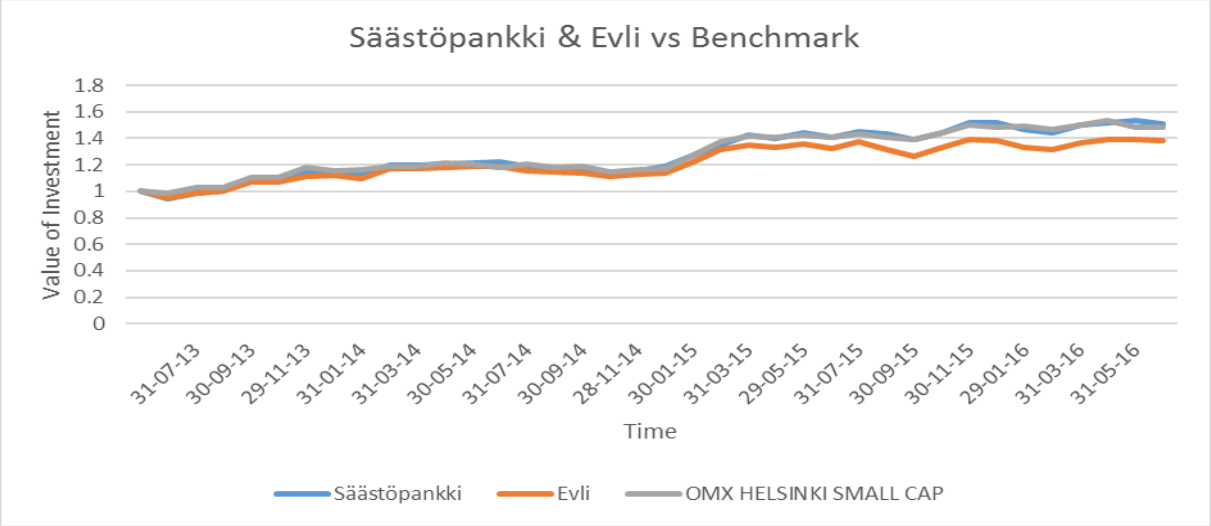
The first pair of funds, which is examined, are the DI and OP. Neither of the funds could deliver better returns than the benchmark. Furthermore, the performance of the benchmark was considerably better than the one of the funds. Over the time period, the index yielded nearly 20 percentage points (pp) more than the DI fund and around 10 pp more than OP one. The differences in CAGRs were approximately four and two and a half pp respectively.

Figure 1. Cumulative returns of DI & OP funds and the OMXH Small Cap index, 2013-2016



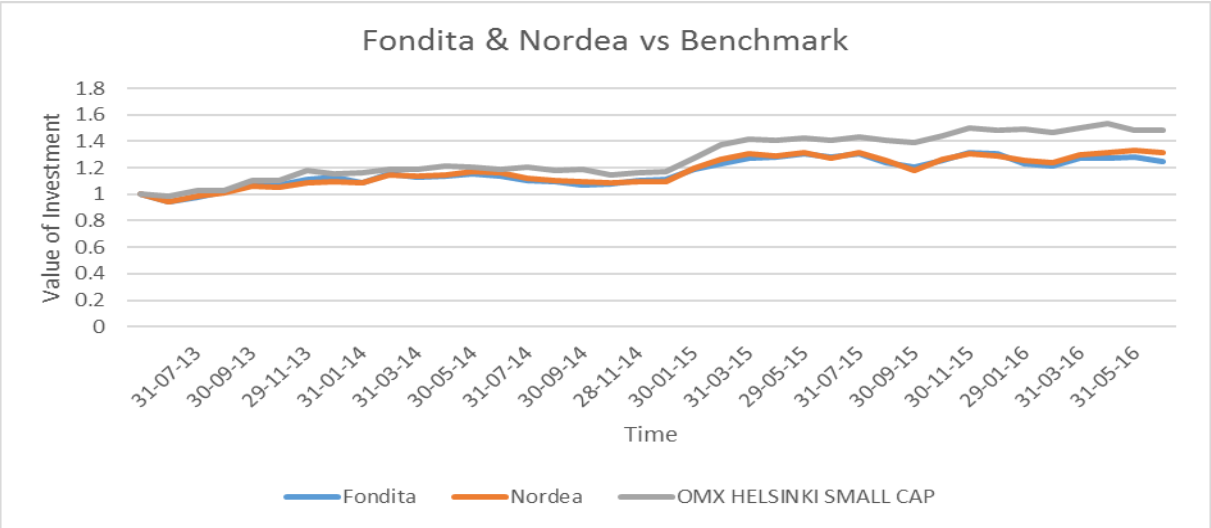
The second pair which is examined are the Säästöpankki and Evli funds. Unlike in the other pairs, in this case, one of the funds could deliver better returns than the benchmark. However, the difference in cumulative returns is only around 3 pp in favor of the actively managed Säästöpankki mutual fund. However, on an annual level, this amounts to around 0.7 pp. Fortunately for the passive management industry, the index yielded 10 pp more than the second actively managed mutual fund from Evli.

Figure 2. Cumulative returns of Säästöpankki & Evli funds and the OMXH Small Cap index, 2013-2016



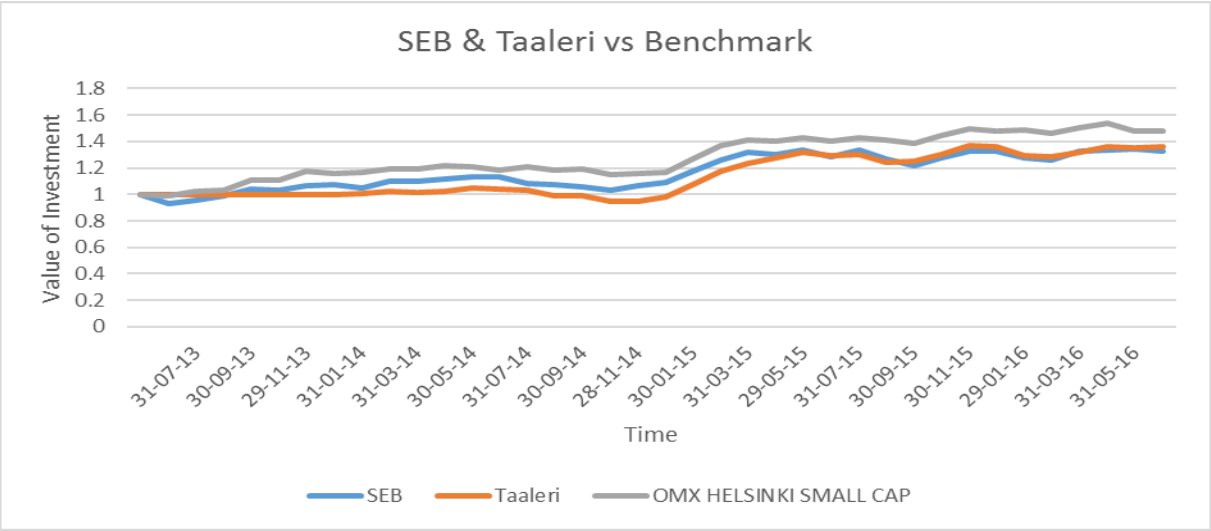
The third pair which is examined are the Fondita and Nordea funds. Most notably, the difference in the performance of the benchmark and a fund is the largest in this section of analysis since Fondita is the worst performing fund in terms of cumulative returns. Its cumulative returns were 125% and CAGR 7.6%, and the differences were approximately 24 pp and six and a half pp in favor of the index. The performance of the Nordea fund was better and it surpassed Fondita by seven and three pp.

Figure 3. Cumulative returns of Fondita & Nordea funds and the OMXH Small Cap index, 2013-2016



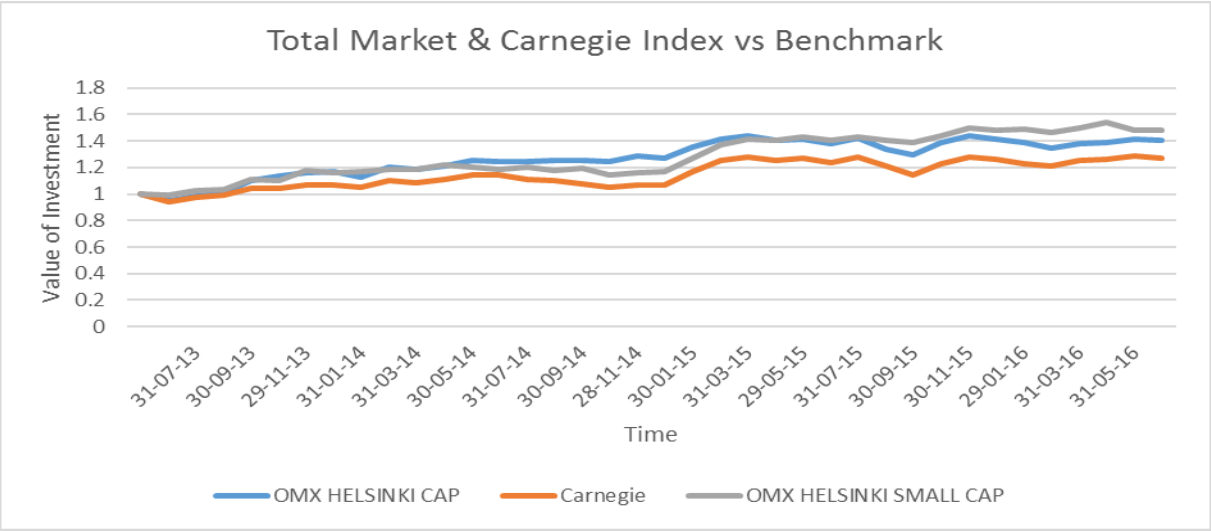
The final pair of funds which is examined are the ones from SEB and Taaleri. Unfortunately, their returns do not significantly differ from what has been presented previously. The benchmark beats both funds by more than 10 pp over the period in terms of cumulative returns and around three pp in terms of CAGR. However, it must be reiterated that Taaleri was founded in December of 2013 which means that there is less data about it than about the others.

Figure 4. Cumulative returns of SEB & Taaleri funds and the OMXH Small Cap index, 2013-2016



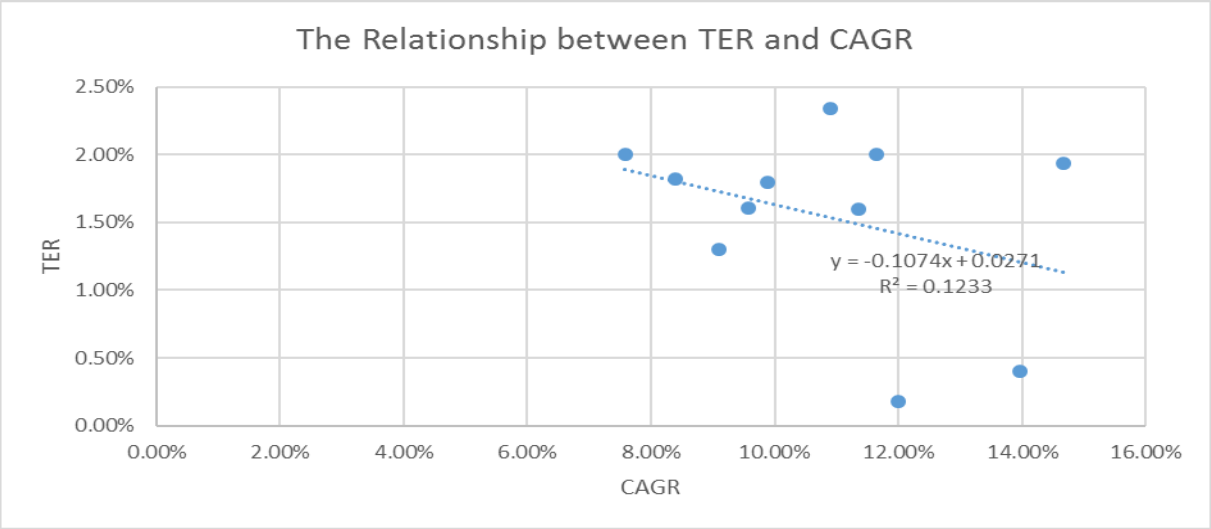
What is more, the performances of the OMXH Cap total Finnish stock market index and a competing small cap index from Carnegie were also graphed. The indices are compared with the benchmark in order to evaluate their utility. Two aspects should be noted. Firstly, the return difference between the broad market and the small cap index is relatively small but it is in favor of the small cap as it should due to the higher risk. However, it is only 2 pp on an annual basis but fortunately all of the indices and funds offer noticeable diversification benefits due to imperfect correlation with the broader Finnish stock market (see appendix 3). Secondly, the performance of the competing small cap index is poor even when compared with the small cap funds, since there was only one fund that could not beat its index which is the Evli mutual fund. To demonstrate, the difference in cumulative returns between the Carnegie and Nasdaq small cap indices is more than 20 pp in favor of the latter. Nevertheless, there can be practical reasons for choosing the less ambitious index as a benchmark.

Figure 5. Cumulative returns of OMX Helsinki Cap & Carnegie indices and the OMXH Small Cap index, 2013-2016



Furthermore, the relationship between the cumulative returns and the total expense ratio was graphed to examine it. The findings are unfortunate for the fund management industry because there appears to be a negative correlation between them. This means that by paying more in terms of management fees the investor will likely earn less. However, it must be noted that the TERs for all of the indices are based on assumptions. For the broad market index, the TER was assumed to be the same as the one of an actual ETF investing in the Finnish stock market (Seligson, 2017). For the small cap benchmark index, it was proxied by using the expense ratio of a small cap ETF investing in the European market (Deutsche Bank, 2017). For the competing small cap index, which is the benchmark of choice of most of the mutual funds, the TER was determined by averaging the TERs of all of the Finnish small cap funds.

Figure 6. The Relationship between TER and CAGR, 2013-2016



In addition, the following table presents a numerical summary of the findings of the chart-based analysis of the cumulative returns. The cumulative returns, CAGRs and TERs mentioned in the earlier paragraphs were approximations derived from the table below.

Table 3. Numerical summary of the findings

	Cumulative Returns	CAGR	TER
DI	129.82%	9.09%	1.30%
OP	139.17%	11.65%	2.00%
Säästöpankki	150.82%	14.68%	1.94%
Evli	138.05%	11.35%	1.60%
Fondita	124.51%	7.58%	2.00%
Nordea	131.59%	9.58%	1.61%
SEB	132.69%	9.89%	1.80%
Taaleri	136.43%	10.91%	2.34%
Carnegie	127.35%	8.39%	1.82%
OMXH Cap	140.49%	12.00%	0.18%
OMXH Small Cap	148.04%	13.97%	0.40%

The findings of this section were similar to the ones of the literature review in the sense that there seems to be considerable informational efficiency because the use of methods, such as trading rules has not likely benefitted most of the funds. In fact, the

actions of the funds have been largely unprofitable since there is a negative correlation between fees and returns.

4.2. Ratio analysis

Examining the correlations between the fund and the benchmark returns begins the ratio analysis section. In other words, ratios which are examined herein are beta and R squared. The betas of the funds are the highest when compared with the Carnegie index which means that they are tracking their benchmark index accurately and most are also beating it. However, the fact that the second highest betas for all funds expect the two best performing ones are with the broad market index is surprising and the trend in correlations is similar to the R squared as well. However, instead of two funds having the second highest correlation with the OMXH Small Cap index, only one, the Taaleri Mikro Markka has its second highest second correlation with the aforementioned benchmark and not with the broad market index. In summation, the correlations of the funds seem somewhat concerning even though they have high correlations with their self-assigned benchmark index, their correlations with the actual Finnish small cap equity market are low and more resemble the returns of the broader Helsinki stock market. This should be worrying to investors because the fees of small cap funds are higher than the large cap funds. If the funds track the broader market, then investors might be better off by investing in cheaper large funds. In order to gain information about the holdings of small cap funds, some of the rules concerning asset allocation are evaluated.

A brief study of the basic information about the funds reveals two possible reasons for the higher correlation with the total market than with the small cap index. The funds might be investing in companies that have a higher market capitalization than the one defined by Nasdaq. For example, the Taaleri fund is allowed the invest in companies whose market value is up to 500 million euro rather than 150 million which is the limit of the small cap benchmark index (Taaleri, 2017). What is more, some of the funds might be investing in companies listed outside of Finland. For instance, the

Säästöpankki fund can invest up to 45% of its assets into European stock exchanges (Säästöpankki, 2017).

The second part of ratio analysis is the evaluation of the risk and return relationship. The results of the chart-based analysis of the cumulative returns indicate that the returns of the funds are the lower than the ones of the small cap benchmark but it did not address the riskiness of the returns in terms of standard deviation. This means that the returns of the mutual funds might still be desirable to investors if the managers are able to yield their returns at a proportionally smaller risk which would result in a higher Sharpe ratio. However, this is not the case because only one fund had a higher Sharpe ratio than the benchmark index but the difference was not great. The Sharpe ratio of the Säästöpankki Pienyhtiö B was 1.315 and the one of OMX Helsinki Small Cap was 1.310. The results are unfortunate because this means that actively managed funds took proportionally more risk than the index representing passive management.

In the final stage of ratio analysis, the average returns and standard deviations were investigated. The average return analysis provided results which were in line with the previous findings. In other words, only one fund had higher annualized average monthly returns than the small cap benchmark and the difference was around one percentage point. The findings of the analysis of the standard deviation delivered perplexing results. The OMX Helsinki Small Cap index had the lowest standard deviation of all of the subjects which is surprising since small companies are regarded as risky and volatile in nature.

Table 4. Numerical summary of the findings

	DI	OP	Säästöpankki	Evli	Fondita	Nordea	SEB	Taaleri	OMXH Cap	OMXH Small Cap	Carnegie
Beta:Cap	0.759	0.850	0.805	0.858	0.806	0.870	0.866	0.614	1.000	0.606	0.867
Beta:Small	0.770	0.763	0.807	0.846	0.674	0.776	0.786	0.849	0.757	1.000	0.779
Beta:Carnegie	0.867	0.962	0.906	0.968	0.871	0.998	1.004	0.729	0.968	0.696	1.000
Sharpe Ratio	0.787	0.986	1.315	0.950	0.617	0.779	0.775	1.137	0.976	1.310	0.681
R^2:Cap	0.717	0.791	0.722	0.795	0.748	0.815	0.744	0.404	1.000	0.459	0.839
R^2:Small	0.590	0.511	0.580	0.620	0.418	0.519	0.490	0.616	0.459	1.000	0.542
R^2:Carnegie	0.837	0.909	0.819	0.907	0.781	0.960	0.896	0.558	0.839	0.542	1.000
Annualized Return	0.101	0.135	0.178	0.131	0.082	0.107	0.111	0.155	0.140	0.167	0.092
Annualized Standard Deviation	0.128	0.136	0.135	0.137	0.133	0.137	0.143	0.136	0.142	0.127	0.135
Monthly Return	0.008	0.011	0.014	0.010	0.007	0.009	0.009	0.012	0.011	0.013	0.007
Monthly Standard Deviation	0.037	0.039	0.039	0.039	0.038	0.040	0.041	0.039	0.041	0.037	0.039

4.3. Paired two sample t-test for means

T-tests have been conducted to analyze the means of the monthly returns of the funds and the indices. As hypothesized in an earlier part of the thesis, average monthly returns of the funds and the benchmark index are believed to be equal. Consequently, the null hypothesis was defined as follows: $H_0: \mu_1 = \mu_2$. However, it is possible that there are differences between the groups, hence the alternative hypothesis was defined followingly: $H_1: \mu_1 \neq \mu_2$. The t-tests are conducted at 95% significance level, which is the most commonly accepted significance level in academic research.

As can be seen in the table 1, none of the fund returns had a t Statistic greater than the t Critical two-tail which means that the null hypothesis must be retained. In other words, failure to reject it means that there is no statistically significant difference between the groups. However, 12.5% of the funds had an average monthly return greater than the benchmark index of OMXH Small Cap. What is more, 25% of the funds could beat the broad market index and 87.5% were able to yield higher returns than the benchmark many funds had chosen as previously anticipated.

It can be argued that the findings are disturbing and demand further analysis because small cap funds should have higher returns than the total market because the small cap funds are riskier due to their underlying securities. The findings of the t-tests are

also in accordance with the indicative evidence of the literature review of the thesis although the performance was assumed to be better since significant overperformance was rare. However, the risk premium provided by the fund sector seems to be lower than what was assumed based on the literary research but since past data was used statements about the future should not be made.

Table 1. t-Test: Paired Two Sample for Means

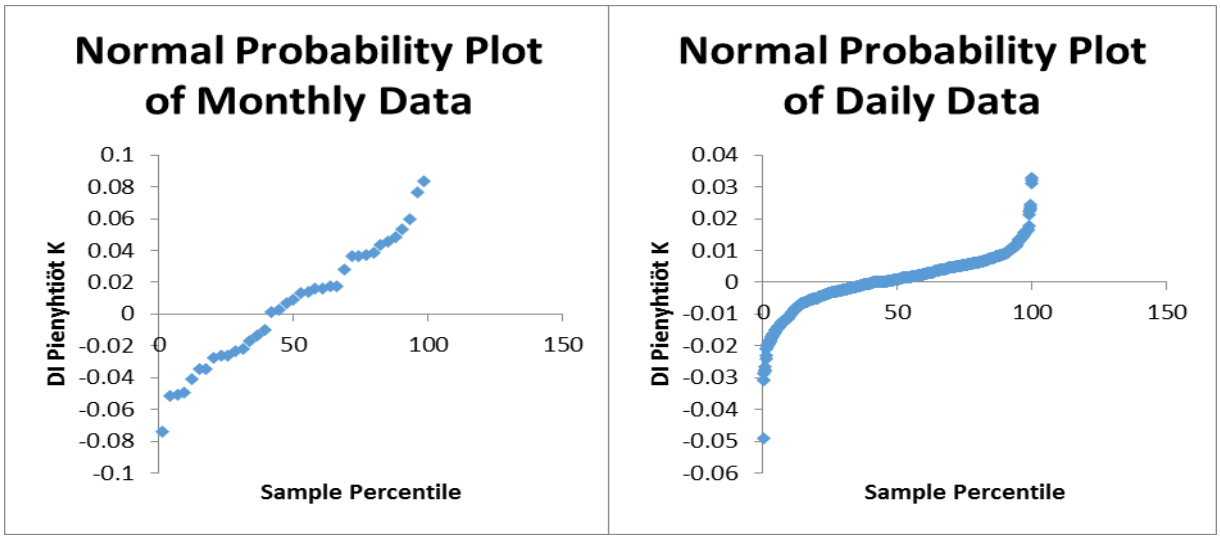
	Mean	Variance	Pearson Correlation	t Stat	t Critical two-tail
DI	0.005	0.001	0.784	-1.180	2.028
OP	0.008	0.002	0.729	-0.500	2.028
Säästöpankki	0.011	0.002	0.779	0.172	2.028
Evli	0.008	0.002	0.800	-0.648	2.028
Fondita	0.004	0.002	0.672	-1.208	2.028
Nordea	0.006	0.002	0.736	-0.931	2.028
SEB	0.006	0.002	0.716	-0.817	2.028
Taaleri	0.009	0.002	0.800	0.293	2.028
OMXH Cap	0.008	0.002	0.701	-0.389	2.028
OMXH Small Cap	0.010	0.002			

4.4. Fama-French three-factor model

At the final stage of the analysis, the Fama-French three-factor model was used to identify sources of excess returns which are also known as alpha. However, the likelihood of alpha was not thought to be great because only one fund had higher returns than the benchmark index OMXH Small Cap. Unfortunately, there were certain limitations when applying the model to the Finnish small cap equity markets as mentioned earlier. Firstly, there are no risk factors specifically for the Finnish market, therefore factors for the European markets were used as proxies as suggested by the source of the factor data (French, 2017). Secondly, the model had to be conducted using monthly returns for two reasons. For one, monthly returns were also used in other sections of the analysis due to conflicting beta and R Squared values of the daily data which is likely due to the high volatility of daily returns. For another, the daily return

data did not follow normal distribution which prohibited its use and required the use of monthly data which was normally distributed.

Figure 7. Normal probability plots of return data



The findings of the model were in line with the assumptions mentioned in the previous chapter. None of the funds nor indices had alpha at 95% level of significance. Instead, the returns were mostly explained by the market returns excess of the risk-free rate and R squared was 0.51 on average for all of the regressions. However, exposure to the small cap and value factors did not explain the returns in a logical way for any of the funds or indices at a statistically significant level which might be the result of an unsuccessful OLS regression or some other model misspecification.

Unfortunately, not much can be concluded from the Fama-French three-factor model alone. It can be asserted that the funds do not have statistically significant alpha for two reasons. Firstly, none of the funds nor indices had statistically significant alpha on a monthly level. Secondly, two funds (Taaleri and Säästöpankki) and an index (OMXH Small Cap) had alpha on a daily level but the alpha might not be real because the benchmark should not have alpha because its returns should be the result of exposure to the small cap risk factor. Having said that, the daily alpha is most likely the result of using risk factor data for the whole European market and not for Finland specifically. However, it should not be concluded that the model cannot be used in the Finnish stock

market because none of the funds had statistically significantly different monthly returns from the small cap benchmark index. Hence, to rightfully evaluate the usefulness of the model another data set must be used.

The findings of the studies mentioned in the literature review set the expectations high for the model and it unfortunately could not fully reach them. The main reason for that is the uncertainty about the explanatory power of the risk factors which did not affect the previous studies. However, since no evidence contradicting the efficient market hypothesis was found by using this model or any of the previous methodologies in the form of excess returns, there is no reason reject it in the context of the Finnish small cap equity markets which means that likelihood of alpha remains low especially for longer time periods.

Table 5. Numerical summary of the findings of Fame-French three-factor model

	Alpha		Mkt-RF		R Square	SMB		HML	
	Coefficients	P-value	Coefficients	P-value		Coefficients	P-value	Coefficients	P-value
DI	0.003	0.510	0.008	0.000	0.563	-0.003	0.335	-0.004	0.160
OP	0.005	0.510	0.008	0.000	0.560	-0.003	0.335	-0.005	0.160
Säästöpankki	0.007	0.198	0.008	0.000	0.465	-0.001	0.842	-0.006	0.080
Evli	0.005	0.360	0.008	0.000	0.574	-0.003	0.342	-0.005	0.068
Fondita	-0.001	0.749	0.009	0.000	0.616	0.000	0.897	-0.008	0.002
Nordea	0.003	0.550	0.008	0.000	0.568	-0.004	0.200	-0.006	0.047
SEB	0.002	0.744	0.009	0.000	0.554	-0.002	0.551	-0.007	0.016
Taaleri	0.009	0.233	0.006	0.007	0.267	-0.001	0.807	-0.002	0.570
OMXH Cap	0.007	0.144	0.008	0.000	0.673	-0.008	0.003	-0.006	0.020
OMXH Small Cap	0.011	0.096	0.004	0.024	0.237	-0.004	0.243	-0.001	0.879
Carnegie	0.011	0.639	0.004	0.000	0.568	-0.004	0.121	-0.001	0.056

5. DISCUSSION AND ANALYSIS

Overall the findings of the analysis were less fortunate for active managers than was expected based on the previous studies by Ennis et al. (2002) and Davis et al. (2008). One possible reason for this might be that the Finnish small cap market is less competitive than the US one which could result from the small size of the Finnish fund management industry. The collective poor performance of the fund managers indicates that they were not able to predict the random walk of share prices because information was likely reflected in the market prices and news due to their unexpected nature could not be predicted and used to make successful investment decisions.

Furthermore, the analysis of the thesis could not reject either of the null hypotheses. The returns of the funds and indices did not have significant statistical difference which means that the first null hypothesis must be retained:$H_0: \mu_1 = \mu_2$.Furthermore, since the returns neither of the funds nor the indices were the result of alpha which proxies investor skill but largely explained by the risk factors also the second null hypothesis is retained.

When placing the findings of this thesis back into the context of previous academic research they were again mostly in line with the previous knowledge. For instance, similar issues in the behavior of fund managers arose in this research as in the previous ones. To mention few, the fund managers seem to have chosen unambitious benchmarks which overstates their performance similarly as in the study by Ennis and Sebastian (2002) because 87.5% of the funds could beat their self-selected benchmark index by Carnegie Asset Management but only 12.5% were able to beat the benchmark index chosen for the purpose of this thesis (OMX Helsinki Small Cap). The significant overperformance might be the result of a fault in the Carnegie index like in the Russell index as shown by both Ennis et al. (2002) and Davis et al. (2008).

However, the results might not be as detrimental to the active management as they seem because research by Philips (2010) indicates that more funds are usually able to beat their benchmark indices during a bear market. This fact might distort the results positively in the favor of passive management since the period from 2013 to 2016 can be best characterized as a bull market. What is more, it must be noted that even the passive funds would most likely lose to the benchmark index by at least the factor of their costs as concluded by Jones et al. (2011) which means that active management should not be totally disregarded. Furthermore, there might be similar issues with the performance of actual passive funds as was demonstrated by Kremnitzer (2012) and Purohit et al. (2015). In the former research, the performance of actively managed products was superior to the ones of passive in emerging markets. In the latter, it was shown that several Indian ETFs had suffered from price premiums and discounts lasting considerable time periods.

6. CONCLUSIONS

6.1. Main findings

A review of the research questions and the answers will begin the overview of the main findings of this thesis.

1. *How has active management performed against passive management overall but also in risk-adjusted terms in the small cap equity markets of Finland?*

As an industry, it has performed quite poorly over the time period used in this thesis and the results should raise questions among people who invest in actively managed funds. Additionally, the findings are even more discouraging when the fact that only one fund (12.5%) had higher returns than the OMX Helsinki Small Cap benchmark is placed in the context that studies show that the number of funds that can successfully compete with the benchmark decreases over time. Unfortunately, the results are not any better for the active management industry in risk adjusted-terms. Only three funds (37.5%) had a Sharpe ratio greater than the index tracking the overall Finnish stock market which means that their average annualized returns were higher than the standard deviation of the portfolio. In other words, the rest of the funds took too much risk to achieve their returns. What is more, only one of the funds had a higher Sharpe ratio than the small cap benchmark index.

2. *Have the actions of fund managers added value for their clients in the form of alpha?*

In short, the actions of the funds have not unfortunately added value represented by alpha when focusing on the monthly returns. However, somewhat conflicting results were reached when looking at the daily returns. Two of the funds and the small cap benchmark had statistically significant alpha but it is likely nonexistent because the benchmark which should not have alpha had it as well.

3. *What kind of a relationship is there between the total expense ratio and returns of a fund?*

The is an inverse relationship between the total expense ratio and the fund returns. The likelihood of above average returns decreases as the fees of the fund increase. This is contrary to the commonsensical belief that investors gain the better returns the more they pay in fees. Thus, investors should favor funds with lower than average fees.

4. *Has the small cap sector performed sufficiently well compared to the overall Finnish stock market to compensate for the inherent riskiness of smaller companies?*

The maximum difference in cumulative returns between any small cap fund or index and the total market index was 10 pp in the benefit of the former. However, in the cases where the cumulative returns were bigger, they were also more efficient for the Sharpe ratio was higher than the one of the index representing the Finnish stock market. However, the sector did not perform well enough to compensate for the risk in the aggregate, but due to the exceptions, the sector should not be abandoned.

5. *Have the active funds chosen the correct benchmark index for themselves?*

The answer depends on the emphasis of the one who poses the question. If accurate tracking is of great interest, then the funds have chosen the correct benchmark. However, if maximizing returns is valued then the funds should have chosen another index that performs better than the Carnegie Small CSX Net Return Finland, such as the OMX Helsinki Small Cap or OMX Helsinki Cap indices.

Now that the research questions have been answered, it can be concluded that Finnish small cap equity funds cannot perform their mission of beating the returns of the Finnish small cap equity market index as a sector. They could not even equal the performance of the benchmark as hypothesized at the end of the literature review. To reiterate, only one fund outperformed the OMX Helsinki Small Cap index. Due to the malperformance, there is room for a passively managed alternative but the demand is not guaranteed because the passive investment management is much smaller in

Europe than in the United States. However, there should not be any technical restrictions hindering the use of passive management since there is an ETF in Sweden, which tracks the performance of the MSCI Sweden Small Cap TR index. However, the performance of the fund would likely be less than the performance of the actual benchmark index at least by the amount of costs but it would likely still outnumber most of the current actively managed small cap funds based on the results of this thesis. Unfortunately, banks do not have a real incentive to create passive funds because they generate lower returns to the banks itself due to the lower average total expense ratio.

6.2. Implications for International Business

The findings of this thesis might have considerable impacts on the support functions of international businesses but it can also have consequences on other sectors of the economy. To illustrate, companies that are obliged to pay defined benefit pensions might be able to decrease their pension costs by optimizing their investments. What is more, this can also increase the economic profitability of the company granting it possibly competitive advantage over its rivals. Additionally, by changing social security related legislation countries could increase the competitiveness of their economies. To demonstrate, if the hypothetical mandatory pension contribution is 25% of gross salary assuming 4% returns under a system where most of the funds are invested in actively. Then a transition to cheaper but as effective passive funds would increase the expected returns which in turn could allow the mandatory contribution to be decreased to 20% of gross salary decreasing these labor costs by 20%. The change would increase the competitiveness of the workforce which might lead to increases both in exports and in employment. Hence, a successful change in investment policy can increase the economic profit and the well-being of households, businesses and countries alike.

6.3. Limitations

Firstly, even though the author of this thesis invests most of his assets in passively managed products, the research has been done as objectively as possible. However, certain limitations were discovered. The main factor hindering the research were the issues with the Fama-French three-factor model. The most significant setback was the lack of Finland-specific risk factors which forced the author to use data for the general European market as proxy though it was mentioned on the webpage that the use of data for the European market would be applicable. Furthermore, several assumptions had to be made about the data especially in the Fama-French model because it would have been out of the scope of a Bachelor's thesis to test them. Furthermore, there was only sufficient amount of data for three years for all of the funds which is a short period in the field of finance. Especially, when the fact that this period was mostly a bull market is taken into consideration. Hence, the abnormal market conditions might not be representative of the norm. Finally, due to the small number of funds, the findings might not be indicative of the other sectors of the Finnish mutual fund industry.

6.4. Suggestions for Further Research

The future research should reflect the growing trend of moving from active to passive management. While active management still dominates in Europe, passive is already 30% of the total assets under management in the United States. Furthermore, instead of comparing funds with each other or with their self-defined benchmarks they should also be compared with an equivalent index from a neutral party which can be tracked passively. In other words, it would be more meaningful to compare the performance of the funds with the next best alternative. Like in medical research, active management which is supposed to produce excess returns (improve health) should be compared with a placebo (passive management) because unnecessary actions might not improve the outcome but cause negative side effects (decrease earnings).

In practice, the methods used in this thesis offer an adequate starting point. However, the thesis only analyzed eight Finnish mutual funds which means that there are many more funds and different categories still to be analyzed. To illustrate, the DataStream

extract containing the time series data used in this thesis contained nearly 1400 funds. Consequently, this thesis should be replicated using a longer time period and a larger number of mutual funds.

Furthermore, by changing some of the methodological aspects more generalizable results could be reached by other academics. For example, it would be ideal to replicate the study by using Finland-specific factor data. What is more, statistical analysis could be used to verify the different assumptions. To demonstrate, the Durbin–Watson statistic could be used to verify the assumption considering heteroscedasticity. Additionally, if the necessary precautions are taken, more complex models, such as the Carhart four-factor model could be used to test for excess returns in the Finnish small cap equity markets.

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8. APPENDICES

Appendix 1. List of the funds and indices with identification information

FUND/ INDEX	Full name	ISIN	Simplified URL	Manager	Inception Date
DI	Danske Invest Suomen Pienyhtiöt K	FI0008803044	https://goo.gl/YFjTZs	Juha Laakso	19.8.1996
OP	OP-Suomi Pienyhtiöt A	FI0008805403	https://goo.gl/Ij8kNo	Teemu Salonen	28.1.2002
Säästöpankki	Säästöpankki Pienyhtiö B	FI4000014139	https://goo.gl/D2xgi2	Olli Tuuri	1.3.2011
Evli	Evli Finnish Small Cap B	FI0008804422	https://goo.gl/51yx0U	Janne Kujala	4.12.1992
Fondita	Fondita Equity Spice B	FI0008802855	https://goo.gl/tsNys7	Kenneth Blomqvist	7.4.1997
Nordea	Nordea Suomi Small Cap K	FI4000018866	https://goo.gl/EfZDVH	Laura Viitala	29.11.2010
SEB	SEB Finland Small Cap B	FI0008802574	https://goo.gl/Ig5sbk	Per Trygg	20.4.1994
Taaleri	Taaleri Mikro Markka Osake A	FI4000072780	https://goo.gl/QS4lQ5	Mika Heikkilä	2.12.2013
OMXH Cap	OMX Helsinki Cap	FI0008900238	https://goo.gl/mkWUVT	N/A	28.12.1990
OMXH Small Cap	OMX Helsinki Small Cap	SE0001775768	https://goo.gl/iaDZj5	N/A	2.10.2006
Carnegie	Carnegie Small CSX Net Return Finland	N/A	https://goo.gl/yirRYQ	N/A	N/A

Appendix 2. Monthly and Daily data

	Beta:CAP		Beta:SMALL		R^2:CAP		R^2:SMALL	
	DAILY	MONTHLY	DAILY	MONTHLY	DAILY	MONTHLY	DAILY	MONTHLY
DI	0.510	0.759	0.694	0.770	0.444	0.717	0.404	0.590
OP	0.782	0.850	0.808	0.763	0.795	0.791	0.418	0.511
Säästöpankki	0.708	0.805	0.772	0.807	0.762	0.722	0.445	0.580
Evli	0.763	0.858	0.818	0.846	0.796	0.795	0.450	0.620
Fondita	0.718	0.806	0.858	0.674	0.572	0.748	0.402	0.418
Nordea	0.713	0.870	0.805	0.776	0.700	0.815	0.439	0.519
SEB	0.686	0.866	0.854	0.786	0.527	0.744	0.403	0.490
Taaleri	0.444	0.614	0.708	0.849	0.424	0.404	0.518	0.616
OMXH Cap	1.000	1.000	0.882	0.757	1.000	1.000	0.383	0.459
OMXH Small Cap	0.434	0.606	1.000	1.000	0.383	0.459	1.000	1.000
Carnegie	0.152	0.397	0.138	0.465	0.028	0.134	0.011	0.147

Appendix 3. Correlation table

	DI	*OP*	*Säästöpankki*	*Evli*	*Fondita*	*Nordea*	*SEB*	*Taaleri*	*OMXH Cap*	*OMXH Small Cap*	*Carnegie*
DI	1										
OP	0.9456	1									
Säästöpankki	0.941	0.933124876	1								
Evli	0.9739	0.973030453	0.951311669	1							
Fondita	0.8826	0.903203951	0.892684389	0.902247756	1						
Nordea	0.932	0.9795832	0.930355392	0.961634679	0.908	1					
SEB	0.9491	0.964734519	0.952429019	0.963923475	0.9288	0.9658	1				
Taaleri	0.8118	0.756088164	0.773896826	0.788293498	0.7503	0.7385	0.775	1			
OMXH Cap	0.8406	0.881826348	0.825462994	0.887137152	0.8656	0.9132	0.8747	0.6359	1		
OMXH Small Cap	0.7813	0.701380847	0.754699877	0.774560166	0.6125	0.7268	0.724	0.7847	0.66131137	1	
Carnegie	0.9085	0.956008502	0.895099174	0.951256702	0.8773	0.9798	0.9449	0.7469	0.927117993	0.741675382	1